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FURTHER STUDIES OF TRANSIT PROTECTIVE
SERVICES FOR CALIFORNIA BARTLETT PEARS.

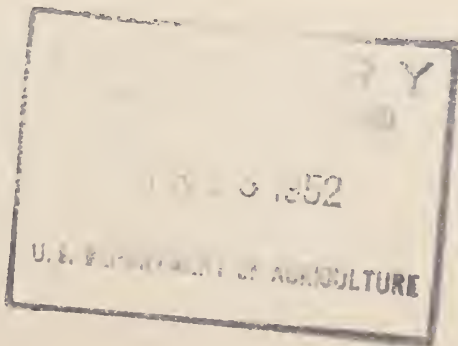
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FURTHER STUDIES OF TRANSIT PROTECTIVE
SERVICES FOR CALIFORNIA BARTLETT PEARS*

The shipping tests on which this report is based represent a continuation of work begun several years ago. The last previous report (H. T. & S. No. 232) covered the results of a transportation test designed to compare modified half-stage icing services with those commonly used for early season Bartlett pears. The testing of protective services has had three principal objectives: (1) economy in costs; (2) for early season Bartletts of minimum maturity, providing only a moderate amount of refrigeration in order that the fruit would ripen some in transit and be ready to consume soon after reaching eastern markets; and (3) for later shipments of more mature fruit, enough refrigeration to prevent appreciable ripening.

Two separate problems in the transit protection of California Bartlett pears were investigated in the present study. Part I covers test with pears from the districts with the earliest harvest and from which fruit of minimum maturity is shipped for the first week or two of the season. Test shipments from these early districts were not precooled and all were moved under half-stage icing in fan cars.

The results of shipping tests from a mid-season district are given in Part 2. These later tests involved room-precooled pears shipped with full-bunker icing under Rule 240 (initial ice only).

Part 1, Early season Bartletts, non-precooled, half-stage icing

METHODS

Paired fan equipped cars were obtained on three different days during the early part of the shipping season at Sacramento River and Marysville shipping points. All cars were destined for New York City and both cars in each pair were loaded on the same day with non-precooled fruit and shipped by the same route. Each of the cars moved under half-stage refrigeration and with fans in operation.

Recording thermometers were placed inside packed boxes of fruit at top, middle, and bottom layer positions at the quarterlength centerline in each test car. Test boxes of comparable fruit from two different orchards

* Acknowledgement is gratefully extended to Dr. D. H. Dewey of the Fresno Field Laboratory for placement of thermometers in the test shipments from Placerville; to the Pacific Fruit Express Co., and the Western Pacific Railroad for providing comparable refrigerator cars for test purposes and supplying transit icing records; and to the DiGiorgio Fruit Corp., Stillwater Orchard Co., California Fruit Exchange, and Placerville Fruit Growers Assn. for cooperation in loading test cars.



were placed in the top and bottom layers at the quarterlength in each car. A recording thermometer was attached to the outside (on a sill under the car body) of one car of each pair for a record of outside temperatures during transit.

Determinations of firmness and surface color of the pears were made on duplicate 15 fruit samples during preparation of the test lots. A pressure tester of the Magness type with plunger of 5/16 inch diameter was used for firmness tests and standard color charts^{1/} for color determinations. Firmness and color were again determined on 15 fruit samples from each test box on the morning following unloading at New York and daily thereafter during the period in the ripening room.

Amounts of ice supplied at initial icings are based on rated bunker capacities of the cars. The amounts shown at reicings are from the records of the Pacific Fruit Express Co. and the several railroad lines used as carriers.

RESULTS

Test 1, cars 1 and 2

The first commercial shipments of Bartlett pears of the 1951 season were made from the Marysville-Yuba City district on July 5. Test cars 1 and 2 were shipped from this same district on July 9 at which time test fruit from two orchards averaged 20 and 20.5 pounds respectively in firmness.

Figures 1 and 2 show the transit temperatures obtained in these cars together with the record of outside temperature. Both cars were equipped with air circulating fans which operated during transit. Car 1 was loaded dry and initially iced (upper half-stage) after loading. The first re-icing was made on the fourth morning from loading (about 2-1/2 days after initial icing) at which time the initial ice charge was exhausted and fruit temperatures dropped gradually following this reicing and remained in the 40° to 50° F. range following additional reicings on the sixth and seventh days.

Car 2 was pre-iced (upper half-stage) prior to loading and replenished at loading point. Fruit temperatures were somewhat below those in car 1 at the end of the second day and rose only slightly during the next two days. The first reicing was early on the fifth day following loading at which time fruit temperatures averaged slightly above 60° F. One more reicing on the seventh day brought temperatures down to about 45° at unloading.

^{1/} Color charts of the California State Department of Agriculture were used with ratings as follows: No. 1, green; No. 2, light green; No. 3, yellowish-green, and No. 4, yellow.

Outside temperatures were moderate while these two cars were enroute. None of the maximums were above 100° and minimums were generally below 60°.

Table 1 shows the condition of test fruit from cars 1 and 2 at unloading and during ripening at 69° - 70° F. These data indicate that no measurable changes occurred in either firmness or color during transit. However, a distinct break in both firmness and color occurred on the second day after unloading and by the fourth day all test lots from both cars were almost eating ripe. Pears testing 2 to 3 pounds are considered eating ripe, some persons preferring firmer fruit than others.

Samples of Bartlett pears from the same two orchards were harvested two days before the first test shipment was loaded and held at the packing house in a special room at 60° to 70° F. until ripe. These pears ripened from a firmness of 20.3 and 20.6 pounds respectively at harvest to 15.6 and 15.9 pounds in 7 days. During this same period color had changed from 1.5 at harvest to about 2. After 10 days at 60° - 70° both lots tested slightly over 3 pounds. Approximately the same amount of ripening had occurred in ten days at 60° - 70° at shipping point as took place in pears from the first two test cars in four day's ripening after shipment. The comparative interval required for ripening indicated that physiological changes had occurred in the test lots during transit even though such progression could not be measured as changes in either firmness or color at time of unloading.

Pears from the test boxes in cars 1 and 2 were rated as salable for 12 days after unloading when held continuously at 69° to 70° F.

Test 2, cars 3 and 4

These cars were loaded at Sacramento River loading points on July 13. This was only a few days after the start of "River" shipments for the season. The same protective services were used as in Test 1 and the fruit was non-precooled. Because of somewhat lower fruit temperatures at loading, delayed initial icing of car 3, and delayed replenishing of car 4 the fruit temperatures did not show the definite rise prior to the first reicing which was evident in cars 1 and 2 (Figs. 3 and 4)*. Car 3 was initially iced at Roseville on the day following loading and reiced on the fourth, sixth and eighth days from loading. All icings were half-stage and the fans were in operating position. Amounts of ice added at the second and third reicings seem low when compared with car 1 with the same protective service but are the amounts recorded by the railroad for those icings.

Car 4 was pre-iced before loading and replenished at Roseville on the day following loading. Billing instructions called for half-stage icing but through error the car was iced to full bunker capacity at the second reicing.

Test lots of pears included in these cars did not change measurably in firmness or color from time of packing to unloading (Table 2), but as was the case in cars 1 and 2 they had softened and colored appreciably by the second

* Recording thermometer in top layer of car 4 defective, middle layer temperatures shown instead in Fig. 4.

day after unloading. On the fourth day all test lots were approaching eating ripe condition. The test fruit was rated as salable for 11 to 14 days from time of unloading.

Test 3, cars 5 and 6

Cars 5 and 6 were loaded at D'Antoni, near Marysville, a week after cars 1 and 2 from the same area. Fruit maturity was somewhat more advanced, the test lots having firmnesses of 19.3 and 18.8 pounds compared with 20 and 20.5 pounds for fruit from the same orchards a week earlier. Because of the more mature fruit both cars in Test 3 were pre-iced before loading. Car 5 was billed standard refrigeration (half-stage) and car 6 replenished with three reicing (half-stage) during transit. Both were fan cars with the fans operating and neither load received any precooling prior to shipment.

Fruit temperatures were very similar in the two cars (Figs. 5 and 6). Both cars were down to 50° F by the fourth day from loading and fruit temperatures remained in the 36° to 50° range thereafter. Outside temperatures were rather high during transit with maximums about 95° on six days and many of the minimums above 65°.

The test fruit data (Table 3) showed that again there was no measurable change in firmness or color during transit. As with test fruit from the four previous cars, a distinct ripening had occurred by the second day after unloading and by the fourth day all test lots were nearly eating ripe. Salability was considered satisfactory for 13 days after unloading for all test lots from cars 5 and 6.

Part 2, Mid-season Bartlett pears, room precooled, full-bunker Rule 240

Bartletts in the Placerville area reach suitable maturity for fresh shipment several weeks after those from the early districts. By this time the markets are well supplied with Bartletts and as there is no particular urgency to begin shipment, fruit maturity is usually somewhat more advanced than in the earlier districts. Consequently in this district emphasis is upon rapid and thorough precooling and low transit temperatures to prevent ripening rather than on protective services designed to promote the initiation of ripening during transit as in the very early districts.

Shipping tests 4 and 5 from Placerville were conducted for the purposes of determining the suitability of Rule 240 (initial ice only) for pears pre-cooled to 32°-33° F prior to loading and whether or not under this service the built-in car fans should be in operation during transit.



METHODS

Two comparable refrigerator cars were placed for loading on each of two consecutive days at Placerville. Comparable cars for Test 4 were initially iced to capacity (11,500 pounds) at Sacramento on the evening of August 15 and moved to Placerville for loading on August 16. Two comparable cars for Test 5 were initially iced to full bunker capacity by the shipper at the warehouse prior to loading on August 17.

All of the Bartlett pears loaded in the four Placerville cars were room precooled for at least 72 hours before loading. Core temperatures of the fruit during loading varied between 31° and 34° F.

Recording thermometers were placed in top and bottom layer boxes in each of these test cars and on one car of each pair a recording thermometer was attached under the body of the car for a record of outside temperatures. No special boxes of fruit were included for ripening determinations at destination.

Each of the four cars used was equipped with Preco floor fans but in each pair of cars the fans were turned off in one car and operated in the other car.

The two cars loaded on August 16 each had 3 inches of insulation in the walls and 3-1/2 inches in the floor and roof. The cars loaded on the following day were of more recent construction than those used in Test 4. Instead of 3 and 3-1/2 inches of insulation these newer cars had 4 inches of insulation in the walls and floor and 4-1/2 inches in the roof.

RESULTS

Test 4, cars 7 and 8

Figure 7 shows the records obtained in boxes of fruit at top and bottom layer positions from cars 7 and 8. The top layer in the car with fans off warmed approximately 11 degrees during transit whereas in the car with fans on the temperature rise was about 9 degrees. Unfortunately the record of the bottom layer temperature for the car with fans on was lost but the bottom layer in the "fans off" car warmed somewhat less than the top layer in the same car as would be expected. Ice estimates made by the railroad at destination on August 25 showed bunkers 1/3 and 1/4 full respectively for the "fans on" and "fans off" cars. As the car with fans on would be expected to melt slightly more ice than the car with fans off the bunker inspection records reported above cannot be explained.

No fruit from these cars was held for ripening but inspection of the loads upon arrival showed the fruit to be hard and green. Apparently temperatures in both cars were low enough to satisfactorily check ripening.

Test 5, cars 9 and 10

The loads in these cars and the transit protective services were the same as in cars 7 and 8 shipped the day previous.

Fruit temperatures recorded in cars 9 and 10 are shown in Figure 8. Both top and bottom layer temperatures increased more in the car with fans off although the reason for a lower bottom layer temperature in the "fans on" car is not clear.

The railroad ice inspection record at destination on August 26 showed bunkers 1/3 full in both cars. Fruit in the cars was reported as hard and green at unloading.

DISCUSSION

The results reported above confirm those obtained in previous seasons with regard to shipment of Bartlett pears from the earliest districts. During the period of minimum maturity pears shipped in fan cars without precooling and under half-stage modified icing arrived in New York City with no measurable change in firmness or color from the condition at packing. However, from the subsequent ripening of test lots of fruit both at origin and at New York it appeared that ripening was initiated in transit by the 4 or 5 days fruit temperatures were above 50° F.

Services designed to initiate the ripening process during transit were desirable because they would facilitate movement of early fruit into consumption quickly and would prevent accumulation of green fruit in the wholesale markets. The pears moved under these half-stage services were firm enough at unloading to withstand the handling necessary for distribution but sufficiently ripe by the third day from unloading to display at retail.

During the first week of the shipping season from both the Marysville-Yuba City district and the Sacramento River district half-stage icing under either Rule 247c (initial ice after loading and 3 reicings in transit) or 254b (pre-ice, replenish, and 2 reicings in transit) was satisfactory with warm loads of fruit in cars with built-in fans operating. With fruit maturity somewhat more advanced, during the second week of the season, half-stage icing under either Standard Refrigeration (pre-ice before loading, reice at all regular icing stations) or Rule 254c (pre-ice before loading, replenish, and 3 reicings during transit) gave adequate protection in fan cars. Obviously as the fruit became more mature and market channels were filled with pears, more refrigeration should be provided. It appeared that precooling before shipment combined with modified icing during transit would be desirable after the first two weeks of harvest in the earliest districts and from the beginning of harvest in the later districts.

The transit temperature records shown in Figures 1 to 4 indicated that temperatures high enough to initiate the ripening process during transit could be obtained by using half-stage icing service and delaying the first re-

icing until the fourth or fifth day from loading. Under this schedule the initial ice cooled the fruit from loading temperature to about 60° F and after depletion of the initial charge fruit temperatures did not drop further and in some cases rose somewhat until the first re-icing. Additional re-icings were sufficient to drop fruit temperatures slowly throughout the remainder of the trip and to final unloading temperatures of 40°-45°.

It should be noted that fan cars with the fans in operation were used in all tests from the early districts. As shown in a previous report (H. T & S. No. 232) modified protective services for non-precooled pears in cars without forced air circulation, may not provide adequate cooling in the top layer with the result that top layer fruit may ripen too much during transit while bottom layer fruit remains green.

The two shipping tests with precooled Bartlett pears from Placerville indicated that Rule 240 (initial ice only) is adequate for Bartletts precooled to 32°-34° F before loading. The transit temperature data also indicated that slightly lower temperatures were obtained in fan cars when the fans were on than in comparable cars with the fans turned off during the transit period.

SUMMARY

Three shipping tests with paired cars were conducted from the early districts to determine the suitability of modified half-stage icing services in fan cars for Bartlett pears shipped to New York City.

Transit temperature records were obtained and test lots of fruit were included in the cars for determination of ripening response.

During the first week of the shipping season from Marysville-Yuba City and Sacramento River shipping points half-stage icing, Rules 247c or 254b, prevented measurable ripening of non-precooled Bartlett pears during transit to New York.

Test lots shipped under these services had ripened measurably by the second day after unloading and were almost eating ripe two days later.

Samples harvested two days before the first test shipments were loaded required ten days at a temperature of 60° to 70° F to reach ripeness comparable to that attained by fruit from the test cars on the fourth day after unloading.

Half-stage icing with either standard refrigeration or Rule 254c prevented measurable ripening of non-precooled Bartletts during the second week of harvest in the Marysville-Yuba City district.

Delay of the first re-icing until the fourth or fifth day from loading appeared to be a satisfactory way to obtain transit temperatures favorable to the initiation of ripening under half-stage modified icing services.

Two shipping tests from a mid-season district indicated that well pre-cooled Bartlett pears shipped in mid-August were adequately refrigerated under Rule 240 with car fans either on or off.

The transit temperature records showed that slightly less temperature rise occurred in precooled fruit shipped with the car fans in operation than with the fans off.

Table 1. Condition of Fruit^{1/} in Test Boxes at Unloading and During Ripening.
 First Test - Loaded July 9, 1951 - Pearson, Calif.

Car	Protective Service	Test fruit from	Position in car ^{3/}	At unloading ^{2/} July 18				Days after unloading at 69° to 70° F.							
				Firm-ness	Color	Firm-ness	Color	1		2		3		4	
								Firm-ness	Color	Firm-ness	Color	Firm-ness	Color	Firm-ness	Color
1	Fan car - fans on, half-stage icing, Rule 247c, initial ice after loading, re-ice 4th, 6th & 7th days from loading.	New England Orchard	Top layer	lbs.		lbs.		lbs.		lbs.		lbs.		lbs.	
			Bottom layer	20.6	1.5	20.6	1.5	11.9	2.0	4.8	2.5	3.4	3.2		
		D'Antoni Orchard	Top layer	20.6	1.5	19.6	1.5	10.0	2.0	4.7	2.4	3.2	3.1		
			Bottom layer	20.6	1.5	19.7	1.5	13.4	2.0	4.2	2.5	3.2	3.3		
2	Fan car - fans on, half-stage icing Rule 254b, pre-ice before loading, replenish after loading, re-ice 5th and 7th days from loading.	New England Orchard	Top layer	20.9	1.5	20.2	1.5	14.4	2.0	5.2	2.4	3.4	3.0		
			Bottom layer	20.4	1.5	18.7	1.5	8.6	2.0	4.3	2.6	3.1	3.4		
		D'Antoni Orchard	Top layer	20.3	1.5	19.5	1.5	9.0	2.0	4.4	2.6	3.1	3.5		
			Bottom layer	20.1	1.5	21.1	1.5	9.4	2.0	4.5	2.6	3.2	3.4		
			Bottom layer	20.2	1.5	19.6	1.5	10.6	2.0	4.8	2.6	3.2	3.1		

1/ Bartlett pears, standard box, wrapped pack, size 165, each determination on 15 fruit sample.

2/ At loading fruit tested as follows: New England Orchard, 20.0 lbs., color 1.5.
 D'Antoni Orchard, 20.5 lbs., color 1.5.

3/ All test boxes were at quarterlength position in cars.

Table 2. Condition of Fruit^{1/} in Test Boxes at Unloading and During Ripening Second Test - Loaded July 13, 1951, Hood and Walnut Grove, Calif.

Car	Protective Service	Test fruit from	Position in car ^{2/}	Days after unloading at 69° to 70° F.													
				At unloading ^{2/} July 23		1		2		3		4					
				Firm-ness	Color	Firm-ness	Color	Firm-ness	Color	Firm-ness	Color	Firm-ness	Color	Firm-ness	Color		
3	Fan car - fans on, half-stage icing, Rule 247c, initial ice after loading, re-ice 4th, 6th & 8th day from loading.	Exchange Orchard	Top layer	lbs.	1.5	lbs.	1.5	14.0	1.5	2.0	lbs.	1.5	4.9	2.0	3.1	3.0	
			Bottom layer	19.5	19.8	19.3	1.5	13.9	1.5	4.8	2.0	20.4	1.5	5.2	2.0	3.2	3.0
		Still-water Orchard	Top layer	19.7	1.5	20.0	1.5	14.7	1.5	6.0	2.0	19.3	1.5	16.0	1.5	3.2	3.0
			Bottom layer	19.9	1.5	19.3	1.5	16.0	1.5	6.0	2.0	19.3	1.5	16.0	1.5	3.2	3.0
		4	Fan car - fans on, half-stage icing, Rule 254b, pre-ice before loading, replenish after loading, re-ice 5th and 8th day from loading.	Exchange Orchard	Top layer	19.2	1.5	18.4	1.5	8.9	1.5	2.2	4.0	1.5	3.1	3.0	
					Bottom layer	19.0	1.5	19.8	1.5	9.3	1.6	2.5	4.0	1.5	3.0	3.1	
Still-water Orchard	Top layer			19.8	1.5	20.1	1.5	11.9	1.5	4.9	2.0	19.8	1.5	3.1	3.0		
	Bottom layer			19.5	1.5	19.9	1.5	12.0	1.5	4.8	2.0	19.9	1.5	3.3	3.0		

1/ Bartlett pears, standard box, wrapped pack, size 165, each determination on 15 fruit sample.

2/ At loading fruit tested as follows: Exchange orchard, 20.2 lbs, color 1.5. Stillwater orchard, 19.4 lbs, color 1.5.

3/ All test boxes were at quarterlength position in cars.

Table 3. Condition of Fruit^{1/} in Test Boxes at Unloading and During Ripening
Third Test - Loaded July 16, 1951, D'Antoni, Calif.

Car	Protective Service	Test fruit from	Position in car ^{3/}	At unloading ^{2/} July 26		Days after unloading at 69° to 70° F.							
				Firm-ness	Color	1		2		3		4	
						Firm-ness	Color	Firm-ness	Color	Firm-ness	Color	Firm-ness	Color
5	Fan car - fans on, half-stage icing, pre-ice before loading, re-ice at all regular icing stations (Standard Refrig.)	New England Orchard	Top layer	lbs.	1.5	19.6	1.5	15.3	1.7	6.6	2.0	3.2	3.0
			Bottom layer	19.5	1.5	20.0	1.5	15.7	1.6	6.7	2.0	3.3	3.0
		D'Antoni Orchard	Top layer	19.4	1.5	20.0	1.5	16.5	1.7	6.8	2.5	3.4	3.0
			Bottom layer	19.8	1.5	20.0	1.5	16.8	1.6	6.7	2.0	3.2	2.7
6	Fan car - fans on, half-stage icing, Rule 254c, pre-ice before loading, replenish after loading, re-ice 5th, 7th and 8th days from loading.	New England Orchard	Top layer	19.8	1.5	19.4	1.5	10.5	1.9	5.2	2.3	3.1	3.0
			Bottom layer	19.3	1.5	18.8	1.5	10.3	1.9	4.5	2.5	3.0	3.7
		D'Antoni Orchard	Top layer	19.5	1.5	19.2	1.5	11.4	1.9	4.5	2.5	3.1	3.7
			Bottom layer	19.0	1.5	19.1	1.5	13.3	1.8	5.0	2.5	3.1	3.0

^{1/} Bartlett pears, standars box, wrapped pack, size 150, each determination on 15 fruit sample.

^{2/} At loading fruit tested as follows: New England Orchard 19.3 lbs, color 1.5+.
D'Antoni Orchard 18.8 lbs, color 1.5+.

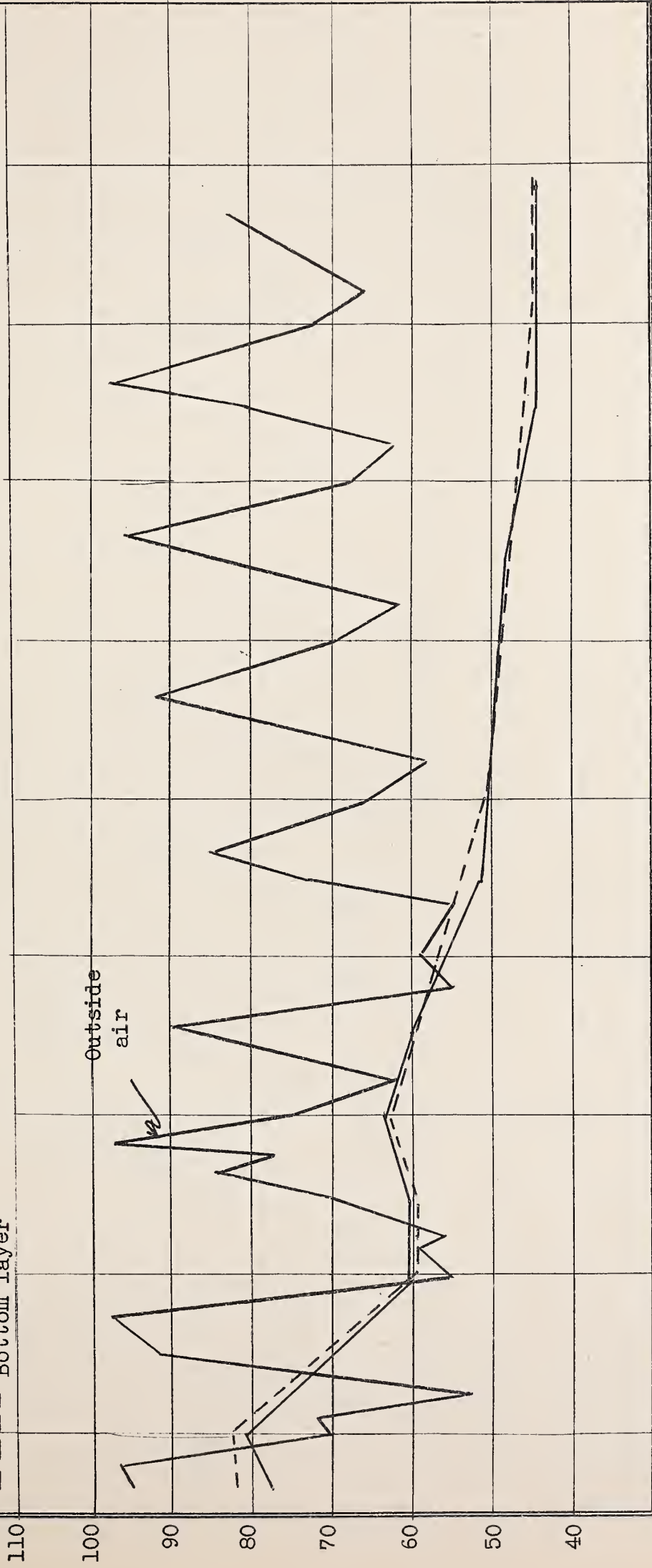
^{3/} All test boxes were at quarterlength position in cars.

Fruit Temperatures

Figure 1

Bartlett pears, July, 1951
 Half-stage icing, Fans on
 Car 1, Test 1, Pearson, Calif.
 to New York, N.Y.
 Rule 247c - Dry car loaded
 720 boxes, through load, on side Routing - S.N., W.P., D.R.G.W., C.B.Q.,
 Erie

— Top layer
 - - - Bottom layer



Date	Initial ice lbs.	re-icings in transit	Pounds of ice.
July 9	6500		
10			
11			
12	6500		
13			
14			
15			
16			
17			

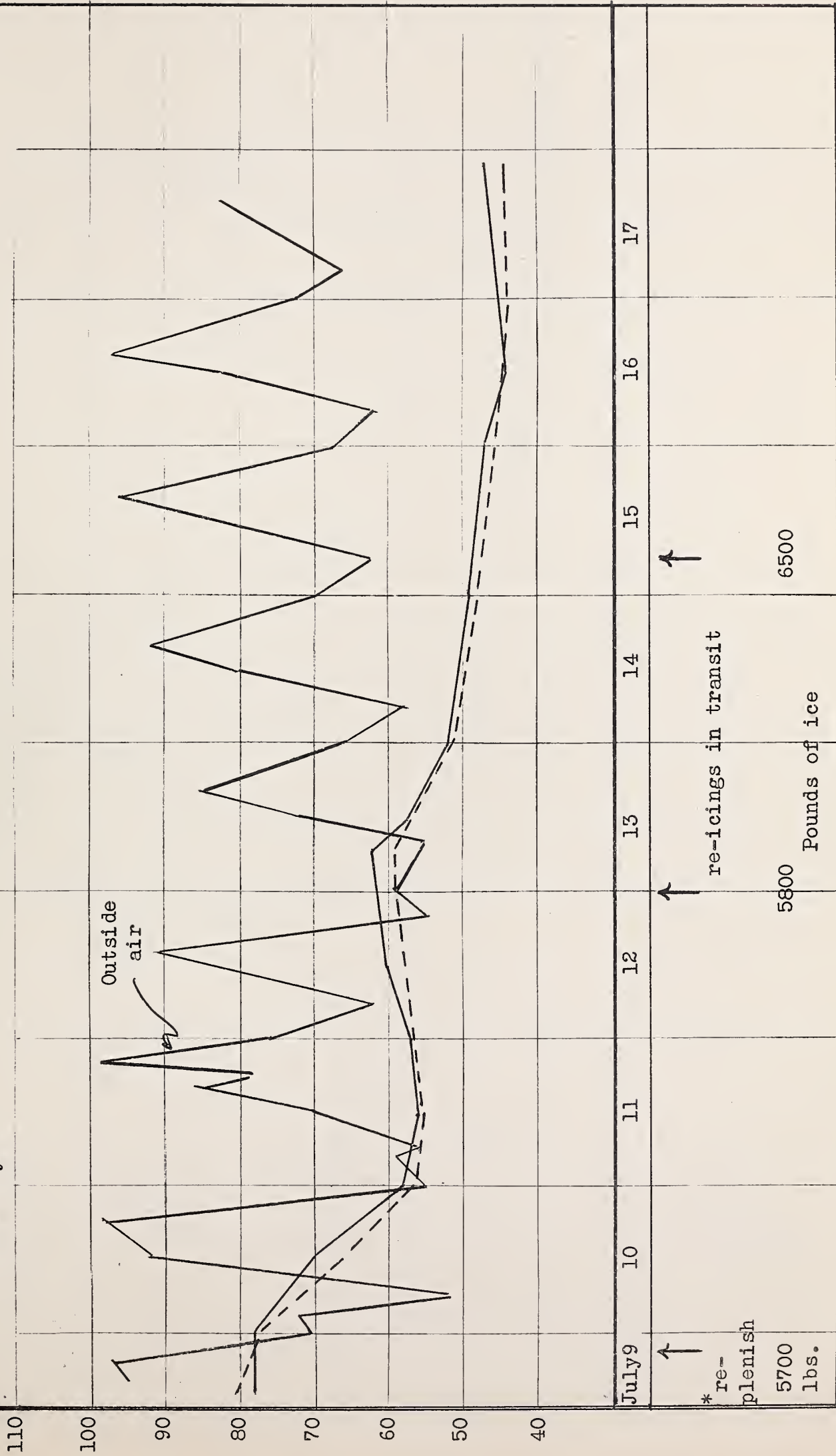
Fruit Temperatures

Bartlett pears, July, 1951
 Half-stage icing, Fans on
 Rule 254b - Pre-iced
 Routing - S.N., W.P., D.R.G.W., C.B.Q.
 Erie

Figure 2
 Car 2, Test 1, Pearson, Calif.
 to New York, N.Y.
 720 boxes, through load, on side

— Top layer

- - - Bottom layer



* Pre-iced July 8 with 6500 lbs.

Fruit Temperatures

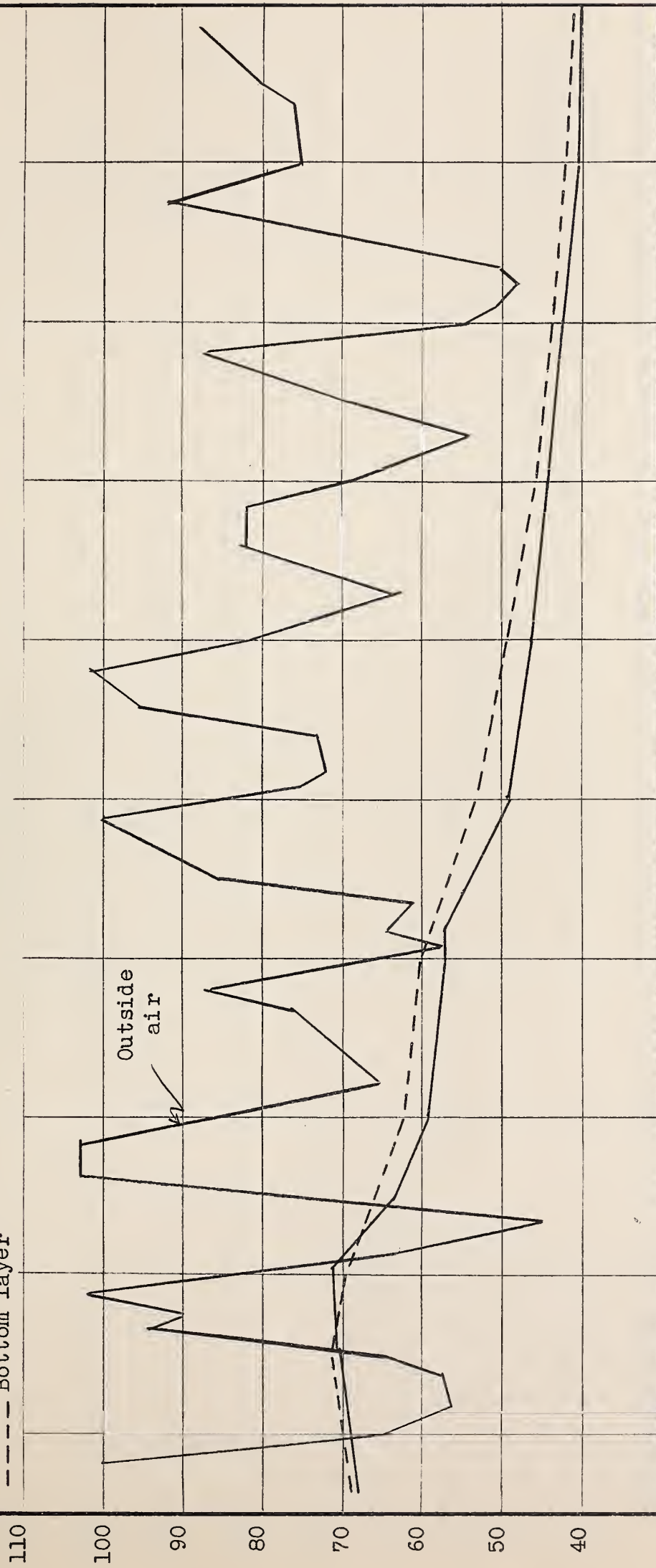
Figure 3

Car 3, Test 2, Hood, Calif. to
New York, N.Y.
744 boxes, through load, on end

Bartlett pears, July, 1951
Half-stage icing, Fans on
Rule 247c - Dry car loaded
Routing - S.P., U.P., C.N.W., Erie

— Top layer

- - - Bottom layer



Date	Top Layer Temp (°F)	Bottom Layer Temp (°F)	Notes	Pounds of ice
July 13	~95	~65	Initial ice	6500
July 14	~100	~65	↑	6500
July 15	~100	~65		
July 16	~100	~65	↑	6500
July 17	~100	~65		
July 18	~100	~65	↑	1700
July 19	~100	~65		
July 20	~100	~65	↑	2000
July 21	~100	~65		
July 22	~100	~65		

Fruit temperatures

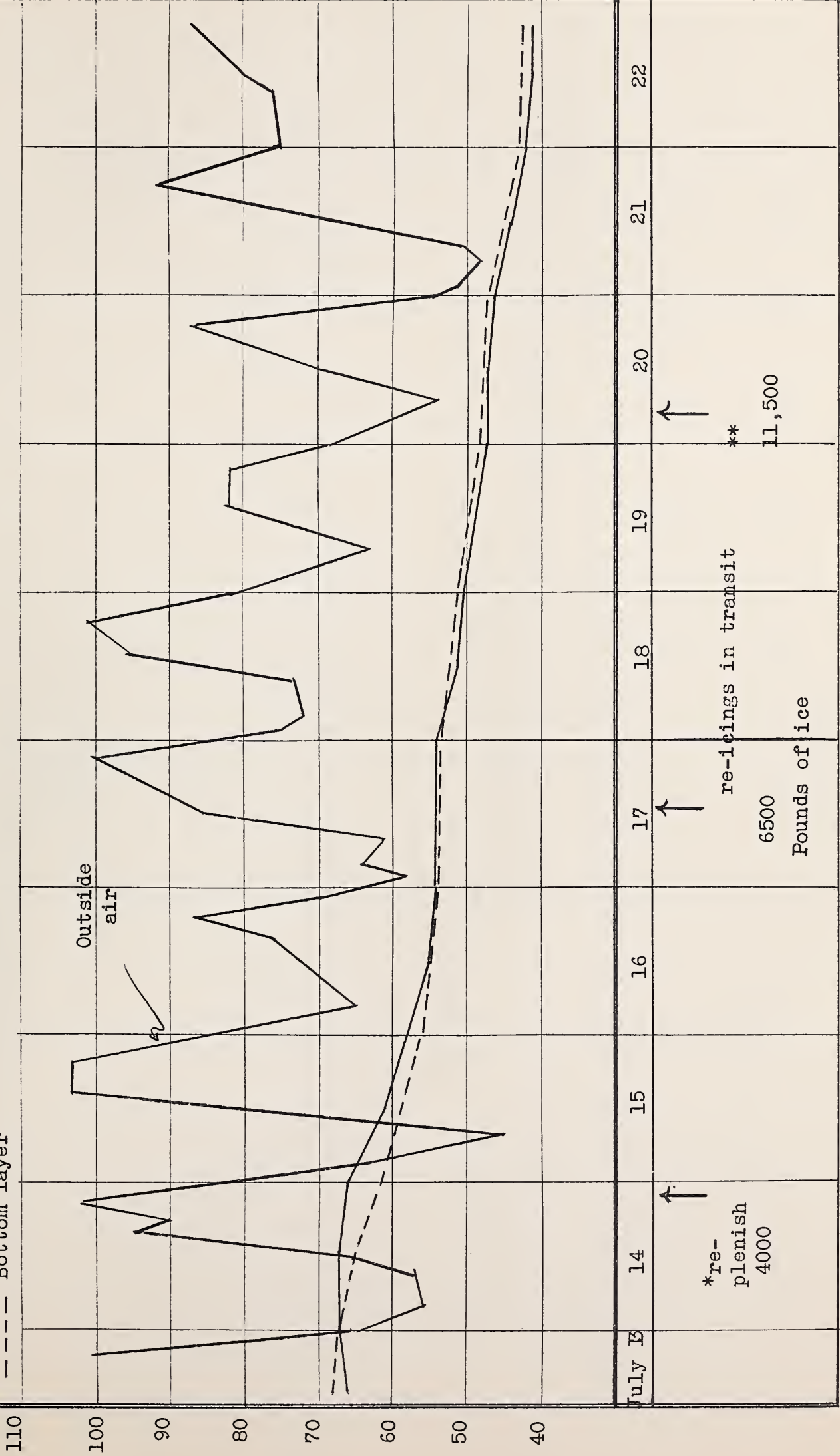
Figure 4

Bartlett pears, July, 1951
 Half-stage icing, Fans on
 Rule 254b - Pre-iced
 Routing - S.P., U.P., C.N.W., Erie

Car 4, Test 2, Walnut Grove,
 Calif. to New York, N. Y.
 722 boxes, center brace, on side.

— Middle layer

- - - Bottom layer



*Pre-iced July 12 with 6500 lbs.

**Grates lowered to full bunker by error

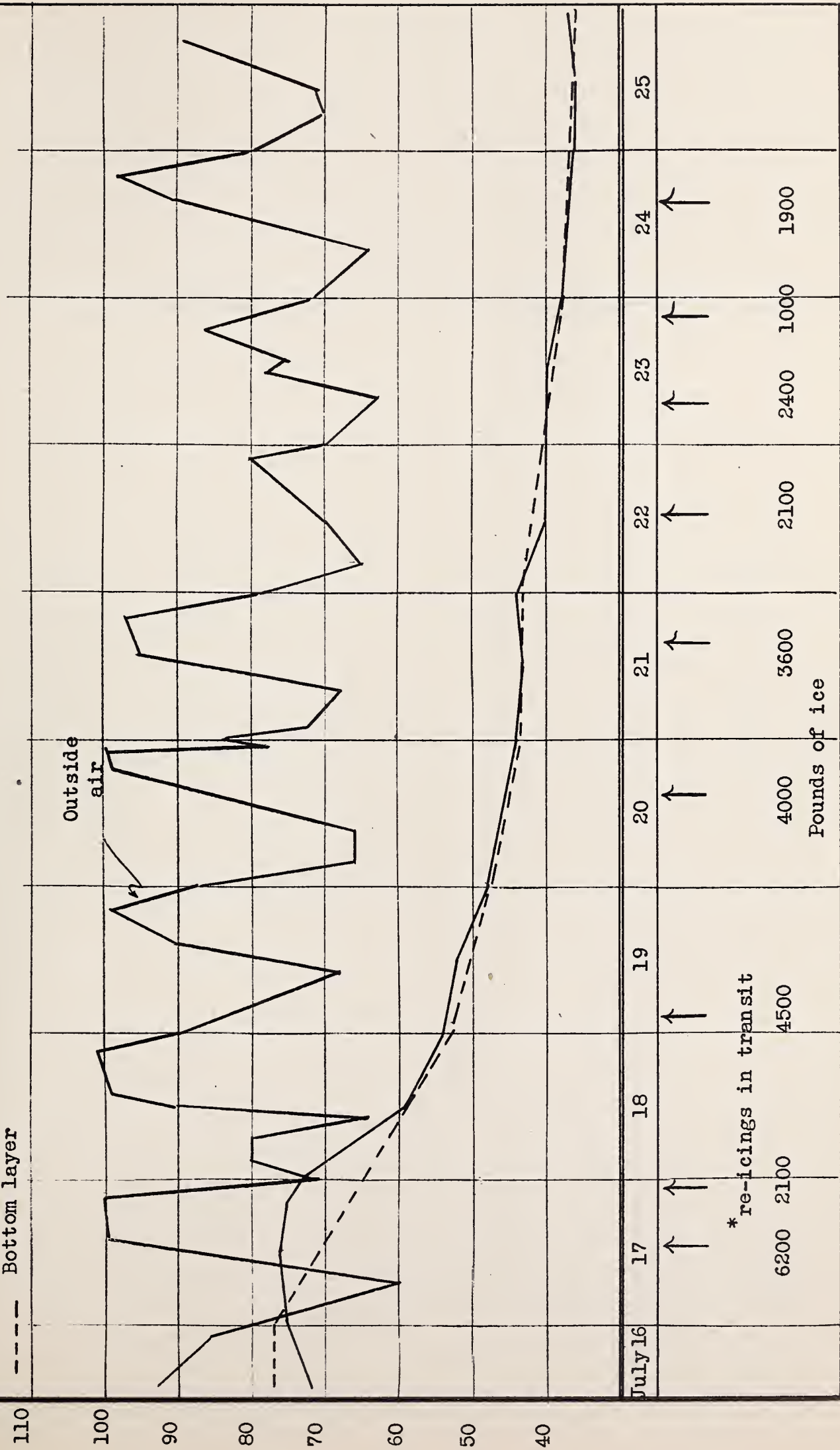
Fruit Temperatures

Bartlett pears, July, 1951
 Half-stage icing, Fans on
 Standard Refrigeration
 Routing - S.P., U.P., C.N.W., Erie

Figure 5
 Car 5, Test 5, Marysville,
 Calif. to New York, N.Y.
 720 boxes, through load, on side

— Top layer

--- Bottom layer

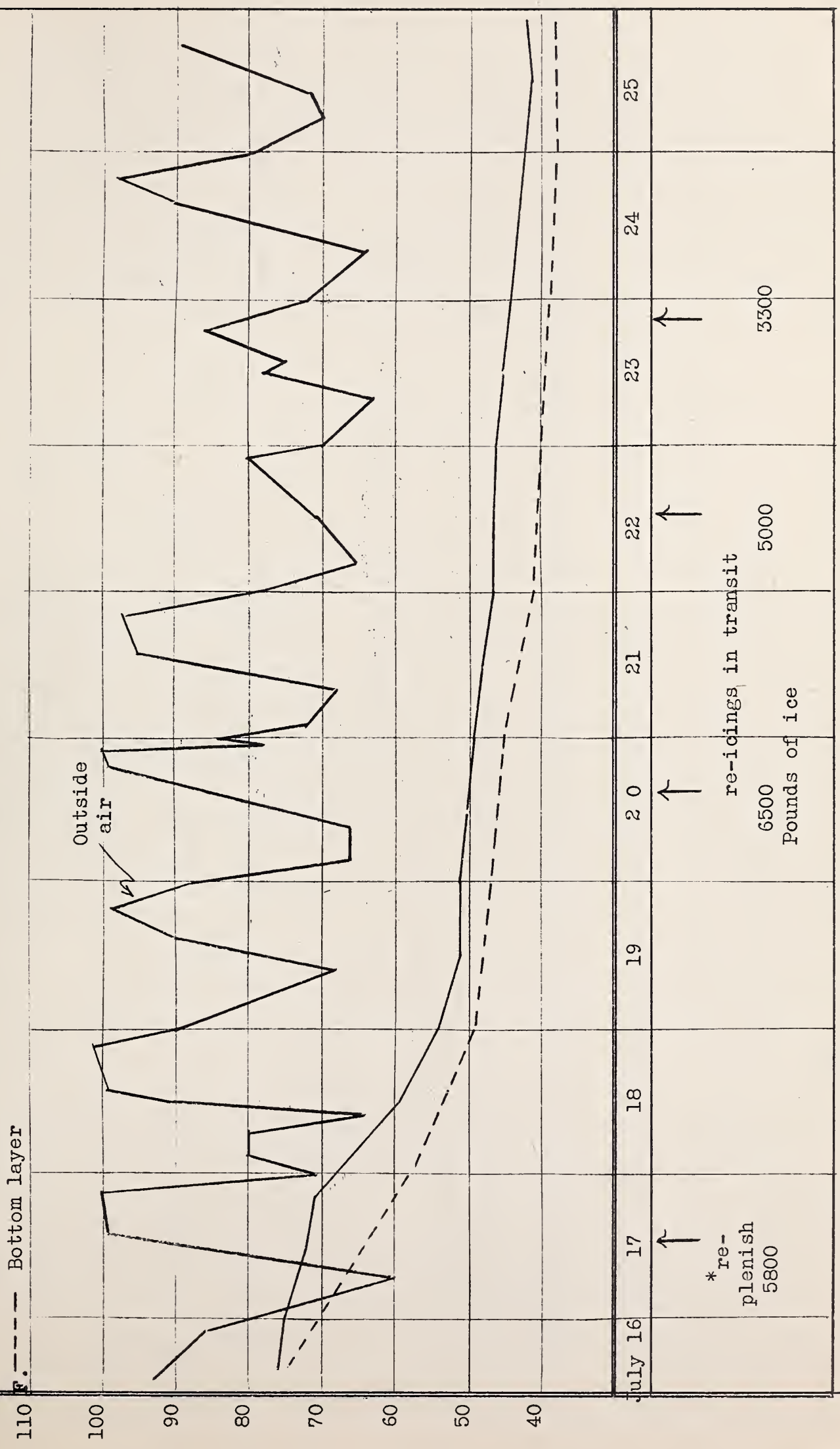


*Pre-iced July 15 with 6500 lbs.

Figure 6
 Bartlett pears, July 1951
 Half-stage icing, Fans on
 Rule 254c, Pre-iced
 Routing - S.P., U.P., C.N.W., Erie

Fruit Temperatures
 Car 6, Test 3, Marysville,
 Calif. to New York, N. Y.
 720 boxes, through load, on end.

— Top layer
 - - - Bottom layer

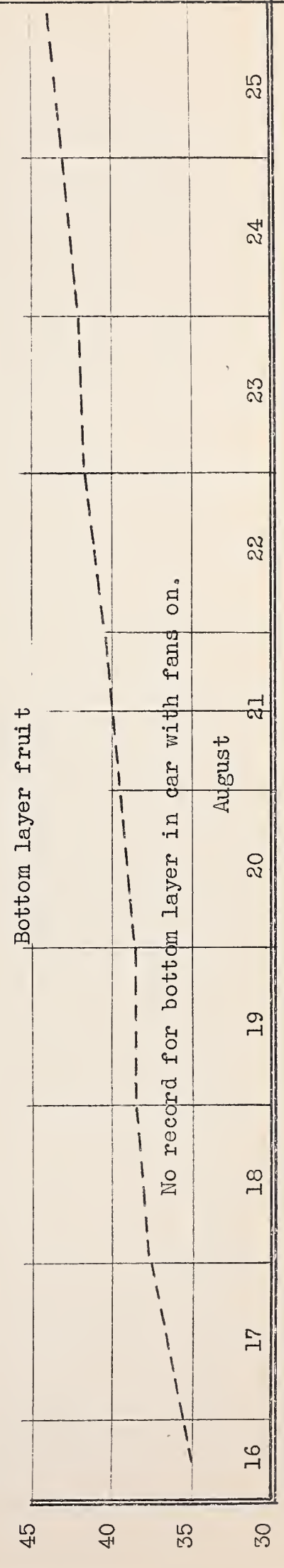
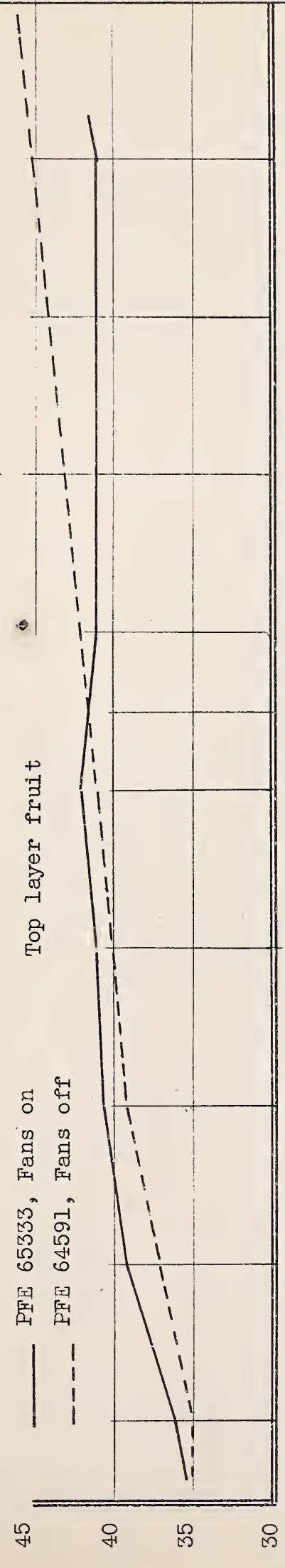
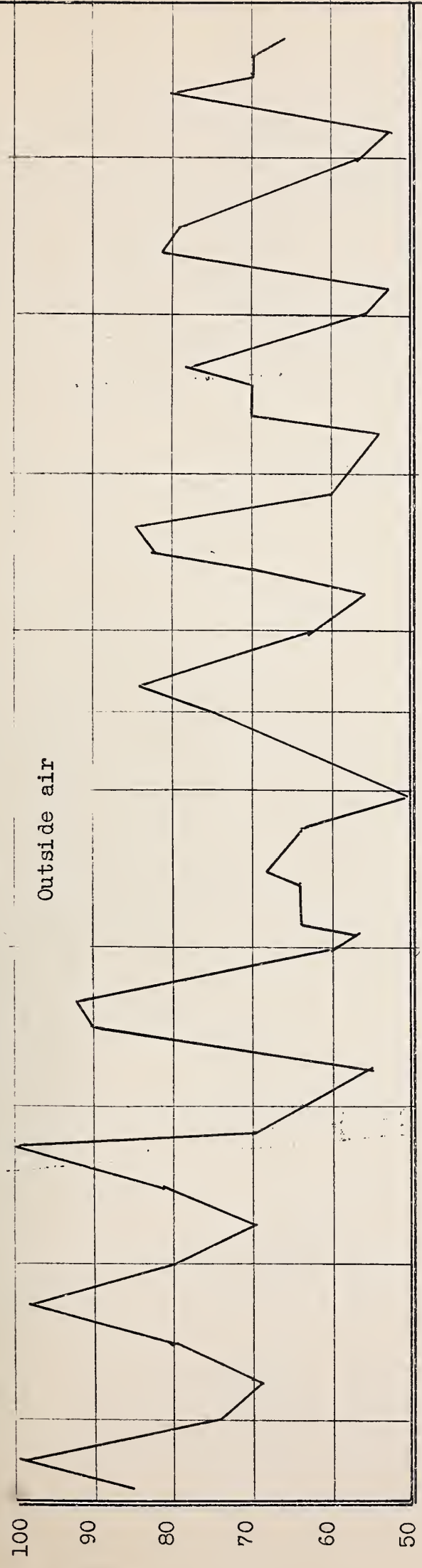


*Pre-iced July 15 with 6500 lbs.

Fruit room-precooled before loading

Figure 7
Cars 7 and 8, Test 4,
Placerville, Calif. to New York, N. Y.
3 and 3½ inches of insulation,
744 boxes, through load, on end

Bartlett pears, Aug. 1951
Full bunker icing, Fan cars
Rule 240 - Pre-iced
Routing - S.P., U.P., C.N.W., Erie



No record for bottom layer in car with fans on.

August

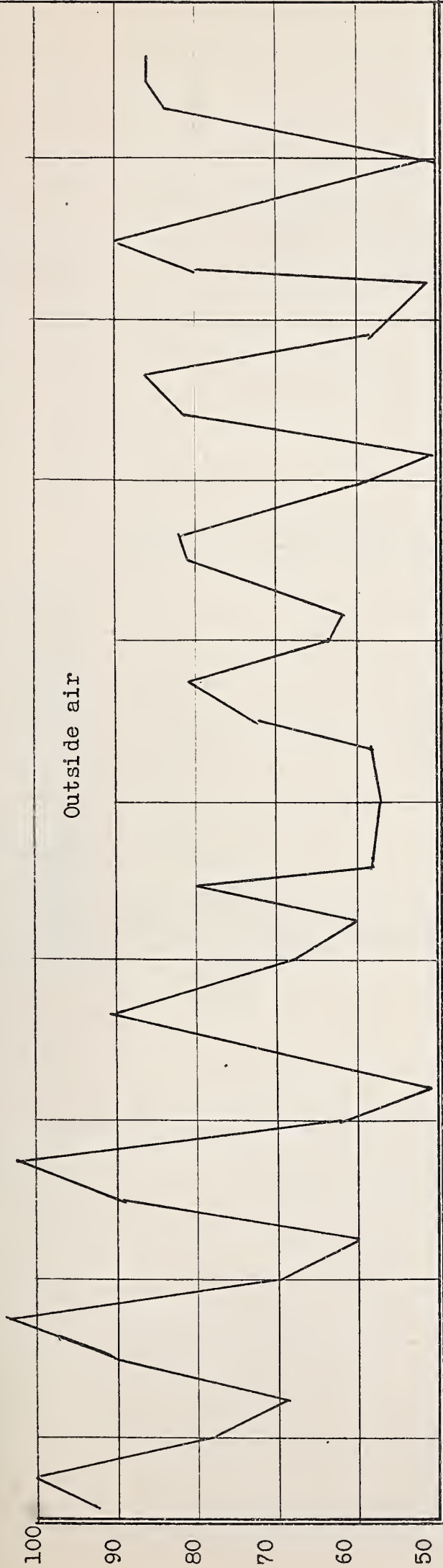
16 17 18 19 20 21 22 23 24 25



Fruit room-precooled before loading

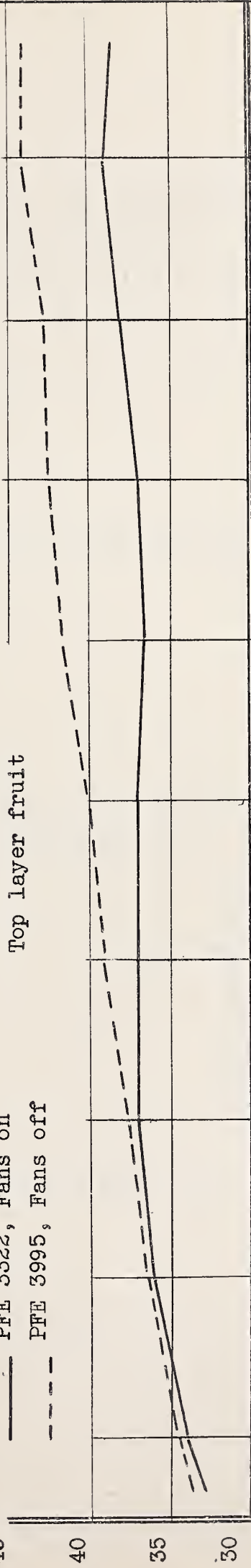
Figure 8 Test 5, Cars 9 and 10, to New York, N. Y. Placerville, Calif. 4 1/2 and 4 inches of insulation, 744 boxes, through load, on end

Bartlett pears, Aug. 1951 Full bunker icing, Fan cars Rule 240 - Pre-iced Routing - S.P., W.P., D.R.G.W., M.P., Wabash, Erie



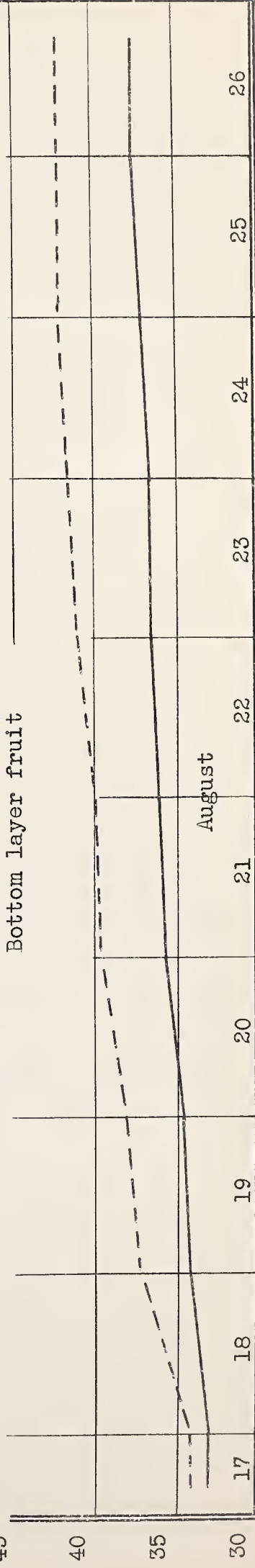
45
40
35
30

— PFE 3322, Fans on
- - - PFE 3995, Fans off



45
40
35
30

Bottom layer fruit



August

17 18 19 20 21 22 23 24 25 26

